its own aspect the warning colours, or "aposemes," of two distinct models. Various objections to the theories of Bates and Müller were noticed, and it was contended that the facts at present known are more favourable to an explanation based on the principle of natural selection than to any other as yet offered. It was admitted that this involves the recognition of adaptation as influencing the development of the colour patterns in question, and it was allowed that the pursuit of the "new teleology" may, like other biological speculations, have been here and there carried too far.

The address ended by emphasising the value of scientifically managed collections of insects in their bearing upon biological problems.

NOTES.

WE are informed that the office of Scientific Attaché at the American Embassy is being closed; the question of the closing being permanent or not is, however, under discussion, and it is possible that the office may re-open in the course of a few months. The Scientific Attaché in London has been the representative of the Research Information Service of the U.S. National Research Council, and the Service will in future be glad to receive communications addressed c/o the National Research Council, 1023 Sixteenth Street, Washington, D.C., U.S.A.

WE learn from *Science* that an American Meteorological Society is in course of formation, and that it will be definitely organised at the meeting of the American Association at St. Louis in December next. The purpose of the society is to fill the need for an easy interchange of ideas among those interested in atmospheric phenomena and their effects on man, and thereby to promote instruction and research in these subjects. It is pointed out that these objects may be brought about by general meetings with the American Association and local meetings at other times; by the use of the *Monthly Weather Review* as a medium for the publication of meteorological and climatological articles; and by the issue of a monthly leaflet containing news, announcements, notes, and queries.

No one is better qualified than Lord Walsingham to express the high estimation in which the late Frederick Du Cane Godman was held by all who knew him, whether in his scientific or in his private capacity. The appreciation of his lamented friend, which has been reprinted by Lord Walsingham from the Proceedings of the Entomological Society of London, speaks in fitting terms of the immense service rendered to the systematic study of natural history by the zeal and generosity of Godman. The sixty-three volumes of the "Biologia Centrali-Americana," the whole expense of which was borne by him, is a splendid monument to the labours of this great naturalist and of his friend and associate, Osbert Salvin. All those who were ever in his company will agree with Lord Walsingham that "there was a peculiar charm of personality which pervaded his whole nature; a generous sympathy with all those whose tastes, pursuits, or studies were kindred to his own; a genuine desire to help, encourage, and enlighten their efforts, and to contribute to the objects for which they were striving." It is intended to establish a memorial to Godman in connection with the British Museum, of which he was an active and efficient trustee.

PRIOR to the war the Wireless Society of London appointed an advisory committee to assist the officials of the Post Office in sifting their numerous applications for licences and recommending those which should be accepted. We now learn from the hon. secretary of the society that the offer of the services of the committee has again been accepted in the same capacity. Several questions in connection with the proposed new licences have still to be decided, particularly with respect to transmitting, but we gather that the genuine experimenter and the amateur who is prepared to conform to reasonable regulations may depend upon the society doing all that can be done at the moment to further their interests.

IN the *Queensland Geographical Journal,* issued in a single number for the years 1916–18, Mr. R. H. Mathews describes the ceremony of initiation, known as Dyer-va-val, amongst the Birdhawal Tribe, whose hunting grounds were situated in the north-east corner of the State of Victoria. There are interesting points of resemblance to the similar rite practised by the aborigines of some northern rivers of New South Wales. During the long course of instruction, which began when the novices were separated from their mothers until they were finally recognised as men, they were taught which foods were lawful and which were taboo. On certain occasions they were taken to the place where the women were assembled, when their mothers and other female relatives gave them vegetable food, and authorised them to eat a particular vegetable from that time onward. On another day, the boys were brought up, and the women gave them water in a native vessel, after which they could drink from any stream in the tribal territory.

THE United States National Museum possesses a considerable collection of examples of ecclesiastical art, a catalogue of which has been prepared by the assistant curator, Mr. I. M. Casanowicz, and issued as No. 2287 in vol. lv., Proceedings of the Museum. The pamphlet is something more than a catalogue, as the compiler has collected a considerable amount of information on the subject. He divides the catalogue into: (1) Ecclesiastical Art of the Roman Catholic Church; (2) of the Eastern Church; (3) of the Armenian Church. With this is given a collection of illustrations of the more important exhibits. Much further material, we are told, remains in storage owing to lack of space.

AN exceptionally interesting bionomic study of a group of insects is found in Mr. John J. Davis's "Contributions to a Knowledge of the Natural Enemies of Phyllophaga" (Bull. Illinois Nat. Hist. Survey, vol. xiii, art. 5). This is a genus of chafers which in North America have much the same economic importance as the cockchafers and their allies have in Europe, the adult beetles eating leaves and the larvæ devouring roots. Black digger-wasps (Tiphia) "are without doubt the most efficient and abundant of the many parasites known to attack Phyllophaga," but the Tiphiæ are themselves parasitised by larvæ of bombylid flies. In his elucidation of such life-relations the author gives much information on the structure and habits of parasitic and predaceous insects of various orders. The importance of birds and mammals (including the domestic pig and the notorious skunk) as devourers of the "white grubs" is also illustrated.

THOSE fascinating tunicates, the Salpidæ, form the subject of an important recent memoir by Maynard M. Metcalf (Bull. 100, U.S. Nat. Mus., vol. ii, part 2), who gives anatomical details of the nervous system and musculature in many species, a "taxonomic study" of the whole family, and an interesting discussion on their distribution. He believes that "while the comparative anatomy of the adult tunicata tells us little of the origin of the Doliolidæ and Salpidæ, the comparative study of the manner of budding gives us reason for believing that Doliolum arose from Pyrosoma-like ancestors . . . and that from Doliolum-like ancestors arose the Salpidæ."

A BRIEF systematic paper of exceptional distributional interest has lately been published by Prof. C. Chilton in the *Ann. Mag. Nat. Hist.* (9), vol. iii., pp. 376–386. He identifies specimens of a sandhopper collected at Picton, New Zealand, with Fritz Müller's *Orchestia tucuranna* from South Brazil—a species known to some naturalists not specialists in the Amphipoda through references in Müller's "Facts and Arguments for Darwin," published in 1869. Another South American Orchestia, *O. chiliensis,* had previously been recognised by Prof. Chilton on the New Zealand coasts.

THE U.S. Department of Agriculture has published (Bull. 780) a pamphlet on Nosema-disease in bees by G. F. White, who gives interesting facts as to the resistance of Nosema spores to heat, drying, and other adverse conditions. His observations as to the occurrence of Nosema in North America and its effect on bees that harbour it will be valuable for comparison by workers in these countries, though he believes that "it is not possible to state whether the Isle of Wight disease and Nosema disease [as present in America] are one and the same disorder." He strangely neglects the work of Fantham and Porter on the subject, barely referring to their papers of 1911 (*Proc. Zool. Soc. Lond.*) and 1912 (*Suppl. Journ. Board Agric.*), and ignoring their subsequent publications.

THE Carnegie Institution of Washington has recently published the first volume of a memoir entitled "The Cactaceæ: Descriptions and Illustrations of Plants of the Cactus Family," by N. L. Britton and J. N. Rose. The systematic study of succulent plants, such as the Cactaceæ, is beset by many formidable difficulties. As a consequence, such study is far from general. Fortunately these difficulties have always proved attractive to a select band of workers gifted with that infinite capacity for taking pains which the peculiar exigencies of the case demand. Among early authors who have earned renown in this exacting field we may recall the names of A. P. De Candolle with his artist colleague P. J. Redoute, of Adrian Henry Haworth, and of Prince Salm-Reifferschied-Dyck. The fit, if few, who labour in this particular field to-day include no one whose name is more honoured than that of the veteran Mr. N. E. Brown. The volume now issued as Publication No. 248 of the Carnegie Institution shows that this chosen band of workers has been augmented by the addition of two worthy recruits. Their handsome and craftsmanlike treatise, which deals with the tribes Pereskieæ and Opuntieæ, is illustrated by thirty-six plates, of which twenty-eight are coloured, and by 302 text-figures, many of them reproduced from photographs. The thorough manner in which the attendant difficulties have been overcome by the careful study of type-specimens and original descriptions, by the extensive collection of living and of herbarium material, and by prolonged field-observation, deserves the highest commendation. The excellence of the illustrations and the lucidity of the descriptions render the work one of the most important contributions yet made to the taxonomy and natural history of a family of succulent plants. It should make relatively simple what has hitherto been an exceedingly difficult task to the botanist and to the cultivator. Both should now be able to identify with some confidence many of the cactaceous plants grown in European plant-collections, and to discard from their lists a host of superfluous names which have long encumbered our catalogues. Grower and systematist alike will look forward with keen expectation, and, indeed, with something like impatience, to the appearance of the further volume in which our authors are to deal with the Cereæ, the last of the three tribes that compose the Cactaceæ.

THE Tyndall lectures delivered by Prof. John Joly before the Royal Institution in April, 1918, have now been published in pamphlet form with the title "Scientific Signalling and Safety at Sea." The lectures were devoted to two of the most urgent problems which confront a sailor, viz. the determination of his position upon near approach to the coast, and the means of avoiding collision at sea, when owing to thick weather, fog, or snow visibility is very low. Until recent years the only aids the sailor had were untrustworthy fog-signals, the use of the lead, and the use of his steam-whistle. Sound is conveyed in a very capricious way through the atmosphere. Apart from the effects of wind, which causes sound to carry badly or to be inaudible owing to the noise and uproar around a ship, large areas of silence are often found in different directions and at different distances from a fog-signal station in calm weather. In spite of these circumstances, these time-honoured methods have been of inestimable value. Prof. Joly suggests that the time has now come when the resources of science should be invoked to supplement the older methods. He advocates the use of "synchronous signalling"—this is, the use of signals propagated in different media, but timed so as to start at the same instant. The particular system recommended is the combination of wireless signals with under-water sound signals. Both methods of signalling are practically independent of atmospheric conditions, and have a much greater range than air-borne signals. The difference between their speeds of propagation suffices to determine the *distance* of the source and the use of either a radio-goniometer or a directional hydrophone enables the *direction* of the source to be ascertained. It is pointed out that the necessary wireless apparatus is now available, and, thanks to the efforts of the Submarine Signal Co., efficient under-water signalling apparatus, such as the submarine bell, Fessenden oscillator, hydrophones, etc., are also obtainable commercially. Several interesting applications of the synchronous signalling method are given, and the pamphlet is to be commended to all who have an interest in those who go down to the sea in ships.

SUMMER weather has this year at times proved very disappointing, although August, which is the general holiday month, was for the most part particularly fine. August was the warmest summer month; the mean temperature at Greenwich was 64·9°, which was 6° warmer than July and 4·5° warmer than June. The mean maximum temperature in August was 75·6°, and there were eleven days with the highest day temperature above 80°, whilst in July the thermometer failed to touch 80°, and in June that reading was only attained on four days. The mean temperature at Greenwich for the whole summer was 61·4°, which is 1° warmer than the summer last year and nearly 3° warmer than in 1916. It is 3·4° cooler than the memorable summer of 1911, which was more abnormal than any summer of recent years, when in both July and August the mean maximum or day temperature was 81°. The weekly weather reports published by the Meteorological Office show that the warmest summer weather occurred during the week ending August 16, when the mean temperature was 3° to 5° F. above the normal, and the maximum day readings exceeded 80° over the whole of England. The total rainfall for the three summer months at Greenwich was 6·03 in., which is 0·6 in. less than the normal for sixty years. The wettest month was July with 2·26 in., and in August the fall was 2·20 in. The summer rainfall was 3 in. less than in 1918, and 4·7 in. less than in 1917; it was more than in 1911, 1913, and 1914. In 1903 the summer rainfall amounted to 16·17 in. Rain fell in all on thirty-four days, and of these July had fifteen wet days. The duration of bright sunshine at Greenwich for the three months was 591 hours. July was the least sunny with 119 hours, which is less than one-half of the sunshine in June and very little more than one-half of that in August.

"NEWTON'S Interpolation Formulas," by Mr. Duncan C. Fraser, originally published in the Journal of the Institute of Actuaries, has been issued as a separate pamphlet. It brings together the whole of Newton's work on interpolation by means of formulæ of finite differences. The three main sources are Newton's short treatise, "Methodus Differentialis," a letter written in 1875 to J. Smith, and Lemma No. 5 in Book iii. of the "Principia." These are supplemented by a letter from Leibnitz to Oldenburg (1672–3) and two letters from Newton to Oldenburg to be communicated to Leibnitz (1676). These letters show that Newton was in possession of the methods of calculation many years before 1711, when the "Methodus Differentialis" was first published. Mr. Fraser gives an English translation of the treatise, correcting some errors and adding useful comments. The pamphlet should be in the hands of all interested in the theory of series and in their use for calculation. It demonstrates that Newton at the age of twenty-three had worked out for himself all the methods of computation now in use, with the exception of calculating machines; and the idea of these, we are reminded, originated with Newton's contemporary, Pascal.

PROF. D. E. SMITH has successfully "filled a gap" by writing a booklet on the early history of numbers that will be the delight of the young, and will prove a "mine of interesting information" to many of their elders. Even as a mere "reader" his charmingly written and beautifully illustrated "Number Stories of Long Ago" (Messrs. Ginn and Co., 48 cents) is well calculated to sow the good seed. Where it falls on fruitful soil the results may not indeed be immediately manifest, but may ultimately astonish that large section of the community who hold that all that deals with number is inherently unattractive, or even repulsive, to mortals. The text also contains problems and tricks designed to amuse and instruct. To these a key, "Number Puzzles before the Log Fire," has been issued by the publishers, price 6*d*. Here we find in disguise many friends, both old and new—echoes from Diophantus, Achilles, and the "turtle," down to products of our modern civilisation, such as:—"A man with $1 wanted $1.25. He pawned the $1 for 75 cents, and then sold the pawnticket for 50 cents. Who lost?" Or again:—"In a certain town 3 per cent. of the inhabitants are one-legged, and half of the others go barefoot. How many shoes are necessary?" It is no doubt well for the civilisation of the future that the answer is "As many shoes as there are people in the town."

IN the Journal of the Franklin Institute for July Prof. A. E. Kennelly and Mr. E. Velander describe a new form of rectangular component alternating-current potentiometer which consumes little power and avoids the use of electromagnetic phase-shifting devices. It is constructed on the principle introduced by Larsen in 1910—that is, it measures the alternating potential required by balancing it against the fall of potential down a non-inductive resistance through which an auxiliary alternating current is passing, and a mutual inductance the primary of which is in series with the resistance. The balance is obtained by means of a vibration galvanometer. The mutual inductance consists of forty-one double coils arranged to form a toroid with a wooden core. The resistance is wound so as to be free from inductance and capacitance. The instrument may be used up to a frequency of 2000. During its use by the inventors the importance of reducing the mutual capacitance between the two windings of the inductance coil has been emphasised.

ALTHOUGH the greatest care is used in the selection of wood for the spars of aeroplane wings, it is not always possible to detect the presence of a "pocket" of resin in the place of sound wood-fibre in some important part of a spar. On this account the United States Forest Service has instituted at its laboratory at Madison a series of tests of the effects of such "pockets" on the strength of spars, and the results of the work already done are summarised in an article by Mr. J. R. Watkins in the August issue of the Journal of the Franklin Institute. Spars 6 ft. long of spruce and Douglas fir of I section, with "pockets" of known size in flanges or web, were tested under load against sound spars. A "pocket" 5–6 in. long, $\frac{1}{8}$ in. wide, and 1 in. deep in the compression flange diminishes the strength considerably. "Pockets" up to 4 in. long in the tension flange have little effect on the strength, but in the web produce a serious decrease of the strength of the spar in horizontal shear. On the whole, the author concludes that small "pockets" produce effects less than has been supposed.

AMONG the forthcoming science books in the new announcement list of *Messrs. Longmans and Co.* are:—"The Feeding of Nations: A Study in Applied Physiology," Prof. E. H. Starling; "Modern Science and Materialism," H. Elliot; "The Elements of Physics," R. A. Houstoun; "Life in Early Britain: A Survey of the Social and Economic Development of the People of England from Earliest Times to the Norman Conquest," N. Ault, and a new impression of "The Profitable Culture of Vegetables, for Market Gardeners, Small Holders, and Others," T. Smith.

Messrs. Macmillan and Co.'s autumn list of announcements which has just been issued contains many books of scientific interest, *e.g.* "Catalysis in Theory and Practice," E. K. Rideal and Dr. H. S. Taylor; "Alcohol: Its Production, Properties, Chemistry, and Industrial Applications; with chapters on Methyl Alcohol, Fusel Oil, and Spiritous Beverages," C. Simmonds; "Science and Fruit Growing. Being an account of the results obtained at the Woburn Experimental Fruit Farm since its foundation in 1894," the Duke of Bedford and S. Pickering; a new edition—the fourth—of "Mendelism," Prof. R. C. Punnett; "Essays on the Surgery of the Temporal Bone," Sir Charles A. Ballance, with the assistance of Dr. C. D. Green, 2 vols.; "An Introduction to Anthropology: A General Survey of the Early History of the Human Race," Rev. E. O. James; "The Ila-speaking Peoples of Northern Rhodesia," Rev. E. W. Smith; "Among the Natives of the Loyalty Group," Mrs. E. Hadfield; "Through Deserts and Oases of Central Asia," Miss E. Sykes and Sir Percy Sykes; "Implication and Linear Inference," Dr. B. Bosanquet; "The Idea of Progress: An Inquiry into its Origin and Growth," Prof. J. B. Bury; "Mind Energy," Prof. H. Bergson, translated, in collaboration with the author, by Prof. H. Wildon Carr; "Geology of India for Stulents," D. N. Wadia; "Aircraft in Peace," Dr. J. M. Spaight; "England," edited by F. Muirhead (The Blue Guides); "Highways and Byways in Northumbria," P. A. Graham, illustrated by Hugh Thomson, and a new edition of "The Handbook to Cyprus," H. C. Luke and D. J. Jardine.

MR. F. EDWARDS, 83 High Street, Marylebone, W.1, has just issued an interesting list (No. 393) of some four hundred books, engravings, and original drawings relating to India. While not mainly devoted to science, it contains particulars of many scientific publications, and is worth perusal. We notice that Mr. Edwards has for sale the Sanskrit library of Prof. J. Ebbeling, consisting of about five hundred volumes.

ERRATUM.—On p. 18 of NATURE of September 4, col. 1, line 9, for "m equal to $\pi a^3\rho$" read "m equal to $\frac{4}{3}\pi a^3\rho$."

OUR ASTRONOMICAL COLUMN.

COMET NOTES.—There does not seem to be any reasonable doubt of the identity of Metcalf's comet (1919 *b*) with that of Brorsen. The following were the elements deduced for Brorsen's comet after the former apparition:—

$$\begin{array}{l} T = 1847 \text{ Sept. } 9{\cdot}5427 \\ \left.\begin{array}{l} \omega = 129^\circ\ 23'\ 17'' \\ \text{☊} = 309^\circ\ 48'\ 49'' \\ i = 19^\circ\ 8'\ 25'' \end{array}\right\} 1847{\cdot}0 \\ e = 0{\cdot}97256 \\ a = 17{\cdot}7795 \\ \text{Period} = 74{\cdot}97 \text{ years} \\ \log q = 9{\cdot}6883 \end{array}$$

The actual period is 72y. 37d., nearly three years shorter than that formerly taken as the most probable. *e* and *a* will need modification in consequence, but log *q* will not be much affected.

As new elliptical elements are not yet to hand, the ephemeris has been continued from the parabolic elements given last week.

Ephemeris for Greenwich Midnight.

	R.A.			N. Decl.		Log *r*	Log Δ
	h.	m.	s.	°	′		
Sept. 15 ...	12	29	21	52	42	9·9341	9·4396
17 ...	12	17	17	47	36	9·9163	9·4789
19 ...	12	8	36	43	11	9·8979	9·5179
21 ..	12	2	8	39	18	9·8788	9·5560
23 ...	11	57	11	35	52	9·8590	9·5937

The comet will probably be some 24′ south of these positions.

Another comet (1919*c*) was announced in Europe as having been discovered by M. Borelly on August 23. It subsequently appeared that Mr. Metcalf found it a day earlier. Possibly it will be known by their joint names.

Miss Vinter-Hansen and Mr. Fischer-Petersen have deduced the following orbit from observations on August 24, 25, and 26:—

$$\begin{array}{l} T = 1919 \text{ Dec. } 19{\cdot}125 \text{ G.M.T.} \\ \left.\begin{array}{l} \omega = 176^\circ\ 15{\cdot}61' \\ \text{☊} = 110^\circ\ 35{\cdot}08' \\ i = 47^\circ\ 21{\cdot}24' \end{array}\right\} 1919{\cdot}0 \\ \log q = 0{\cdot}17608 \end{array}$$

Error of middle place (observed *minus* computed) +0·02′, 0·00′.

Ephemeris for Greenwich Midnight.

	R.A.			N. Decl.		Log *r*	Log Δ
	h.	m.	s.	°	′		
Sept. 10 ...	14	34	23	19	26		
14 ...	14	41	37	17	44	0·2987	0·3957
18 ...	14	49	5	16	0		
22 ...	14	56	46	14	16	0·2838	0·3918

The magnitude on September 22 is given as 8·7m. It is slowly brightening.

Mr. Burnet desires to point out that in the occultation of a faint star by Jupiter for which his prediction was lately given in this column, the date should read September 14d. 15h., not 15d. 15h. That is, in civil reckoning it is at 3 a.m. on September 15.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

A LIMITED number of grants-in-aid to persons employed in chemical works in or near London desirous of extending their knowledge of chemistry will shortly be made by the Salters' Institute of Industrial Chemistry. Applications must be made before September 20 to the Director of the institute, Salters' Hall, St. Swithin's Lane, E.C.4.

THE University of Queensland is seeking for a lecturer of geology to act under the direction of the professor of geology and mineralogy. The appointment is for five years, and the commencing salary will be at the rate of 400*l.* per annum. Applications must be forwarded to reach the Registrar of the University of Queensland, Brisbane, not later than November 15 next. Each applicant must state his age, supply full particulars as to his teaching experience and general qualifications, and furnish certified copies of his certificates and testimonials. A recent photograph should also be forwarded. If not resident in Australia, 50*l.* travelling expenses will be granted to the successful applicant.

THE new session of Battersea Polytechnic opens on Tuesday, September 23, and particulars of all the courses are given in the Calendar of the Polytechnic, obtainable on application to the Secretary, Battersea Polytechnic, London, S.W.11. The courses include the following:—Full day and evening courses in preparation for the University of London Intermediate and Final Degree Examinations (internal and external) in science, engineering, and music; day courses in mechanical, civil, electrical, and motor engineering; architecture and building; chemistry; gas engineering and manufacture; paper-making and wholesale stationery work; mathematics; physics; teachers' courses in domestic science; courses for sanitary inspectors and health visitors, and in art and crafts. Evening courses in mechanical and electrical engineering, mathematics, physics, chemistry, hygiene and physiology, photography, art and crafts, languages, domestic science, music, physical training, and general subjects.

THE report of the Librarian of Congress (U.S.A.), now before us, deals with the fiscal year ending June 30, 1918. The influence of the war on the library at Washington reproduces fairly closely the experience of the libraries in this country. There has been some falling off in accessions due to the closing of the book markets of the world, and also a change in the character of the library work. Workers new to their task have invaded the reference department with inquiries of a novel character which have thrown a great strain upon the energies of a depleted staff, some cases apparently revealing the deficiencies of the library. That again is an experience common to us all. But "the apex of our curve of stress," says the report, "has also shifted from morning to evening and from week-days to Sundays through the presence here of thousands of new Government employees, who can come to us only after their office-hours are over," the average of Sunday readers per hour being three times greater than the week-day average. Thus there is no "early closing" movement in the United States